including dialkylbenzene, and employing said polyalkylated aromatic component as at least a portion of the polyalkylated aromatic component supplied in subparagraph (b) of claim 1.

Cancel claim 7.

Claim 8, line 1, change "7" to -- 1 --;

Remarks

Reconsideration of this application is respectfully requested in view of the foregoing amendments and the following remarks. By this Amendment, claim 7 has been cancelled and the subject matter thereof incorporated into claim 1 so that claim 1 now provides for an integrated alkylation/transalkylation process. The appropriate amendments have been made in dependent claims 8 and 9 to make them dependent from claim 1 as amended. These amendments are proposed in order to place the application in condition for allowance for reasons set forth below, or if not in condition for allowance, in better form for appeal.

The foregoing amendments do not raise any new issues requiring further search or consideration by the Examiner since claim 1 as amended corresponds in subject matter content to original claim 7.

It is noted that the Final Rejection includes a rejection of claim 1 to 6 under § 102 and under § 103. In reviewing the Examiner's comments which refers to modification of the West process, it would appear that the main thrust of the rejection is one of obviousness under § 103 rather than § 102. In any event, since claim 1 has been amended to incorporate the subject matter of claim 7 which was the subject of only a § 103 rejection, it appears the issues in this case as now amended

involve only the question of obviousness to one of ordinary skill in the art within the meaning of 35 U.S.C. § 103.

Before addressing the Examiner's remarks specifically, it is believed worthwhile to consider the nature of the West disclosure in its entirety. First, zeolite Y is but one of many zeolites proposed for use in West in arriving at the catalyst component disclosed there. Various forms of zeolite Y are proposed as the starting molecular sieves for use in preparing the West catalyst. These various forms of zeolite Y are identified as steam-stabilized Y zeolites, dealuminated Y zeolites, and ultra-hydrophobic zeolites. Any one of these three types of Y zeolites can be used in West as the starting material from which the alkylation (or transalkylation) catalyst can be prepared. As the Examiner will recognize, the catalyst actually used in the transalkylation process is one in which the catalyst has been hydrated by an amount above 3.5 wt.% water, with the water content ranging up to 25 wt.% and preferably from 5-15 wt.% or 5-10 wt.%. One of the three modified zeolite Y catalysts in West is defined by reference to U.S. Patent No. 4,401,556 and UK Application No. 2,014,970 in terms of a number of factors including a surface area of at least 350 m^2/g. with a specific surface area delineated as being between 500 and 700 m^2/g. Presumably, the other zeolite Y catalysts or molecular sieves disclosed in West as starting materials would have similar surface areas up to or in excess of 700 m^2/g since most zeolite Y catalysts range in surface area from 600 m^2/g to perhaps 800 m^2/g.

Regardless of the starting material, the basic zeolite Y catalyst used as the starting material is heavily hydrated in order to arrive at the final product. Hydration of the catalyst can be expected to have two effects. First, the incorporation of the water molecules into the crystal structure of the zeolite will decrease the porosity of the zeolite. Correlated in terms of surface area, the heavy hydration of the molecular sieve following the teachings of West would result in a substantial

increase in surface area. Recalling that the preferred ultra-hydrophobic zeolite Y used as a starting material has a surface area between 500 and 700 m^2/g, obviously the incorporation of water in amounts typically ranging up to 25 wt.% , and preferably in amounts up to 10-15 wt.%, will have a profound impact on porosity, *i.e.,* reducing porosity, with a corresponding increase in surface area. In fact, this phenomenon is relied upon in the West procedure as described in the first full paragraph of column 8 of West. There it is stated that the added water absorbs onto active sites in the molecular sieve, thereby deactivating them. In fact, when it is recognized that a water molecular has a kinetic diameter of about 2.6 Angstroms, nearly one-half that of benzene (5.85 Angstroms), it can be seen that the hydration of the zeolite Y starting material will have a profound impact upon its porosity. Even assuming one following the teachings of West starts out with a zeolite Y molecular sieve having a surface area near the minimum proposed in the definition for ultra-hydrophobic zeolite Y, because of the heavy hydration, the results in terms of the surface area of the catalyst as actually used in the transalkylation process will, of course, be substantially greater.

As indicated earlier, West references U.S. Patent No. 4,401,556 and UK Application No. 2,014,970 for a definition of "ultrahydrophobic Y zeolite." Thus, West states at the bottom of column 5: "According to these references, a UHP-Y zeolite is defined as a zeolite having . . . a surface area of at least 350 m^2/g . . ." These two references are incorporated by reference in West for a disclosure of the UHP-Y zeolite. These patents call for surface areas of at least 350 m^2/g and disclose that the actual UHP-Y zeolites involved have surface areas well above this figure. In UK '970, the surface areas of the products actually disclosed there are given as 530 m^2/g (Example 1), 450 m^2/g (Example 2), and 600 m^2/g (Example 3). In the '556 patent, the surface areas for the zeolite actually disclosed are 530 m^2/g (Example 1), 540 m^2/g (Examples 2 and 3), and 579 m^2/g

(Example 4). These figures are, of course, consistent with the surface area of the zeolite Y actually proposed for use in West, *i.e.*, a surface area between about 500 m^2/g and 700 m^2/g.

It is important to recognize that these surface areas are not the surface areas of the catalysts actually used in the transalkylation procedure of West but the surface areas of the zeolite Y's used as starting materials. It will be recalled that West requires that the zeolite Y used as a starting material be treated with water so that the water content of the fresh catalyst is above 3.5 wt.%. Amounts of 5-10 wt.% and 5-15 wt.% are said to be preferred. If one were to select a zeolite Y starting material among the various zeolites actually disclosed in West and the '970 and '556 documents incorporated by reference, the surface area of the starting material would be at least 450 m^2/g per Example 2 of the '970 patent. Zeolite Y can typically be expected to have a pore volume of about 0.25 to 0.3 ml/g of catalyst, perhaps less. Assuming the minimum amount of water (5%) is added, this would amount to the incorporation of 0.05 ml of water into each gram of zeolite, thus reducing the pore volume by 0.05 ml. For a void volume of the starting catalyst material of .25 ml/g, this would amount to a 20% decrease in pore volume (from .25 ml/g to .20 ml/g), corresponding to a 25% increase in surface area from 450 m^2/g to 563 m^2/g:

$$\frac{.25ml/g}{.20ml/g} x \ 450m^2/g = 563m^2/g$$

Should the pore volume of the zeolite Y catalyst be near the upper end of a typical pore volume, *i.e.* 0.3 ml/g, the corresponding surface area, assuming 450 m^2/g of starting material for the zeolite Y actually used in the transalkylation procedure, would be about 540 m^2/g.

In view of the foregoing discussion, it is believed the Examiner will recognize that the surface area of the hydrated zeolite Y catalyst actually used in West, if UHP-Y zeolite is used as the starting material, would be well above the surface area of no more than 500 m^2/g called for in

Applicants' independent claim 1. Further, it is to be recognized that the numbers actually developed above are based on the assumption that one following the teachings of West would select as a starting material a catalyst of a low surface area among the zeolites disclosed in the references and then add water in an amount at the bottom end 5% of the water addition range. Obviously, in viewing the prior art reference as a whole and considering the many options available in the prior art in terms of surface area of starting material and the amount of water to be added, the surface area of the hydrated zeolite actually used would be well in excess of those surface areas calculated above. It is clear that even making assumptions most favorable to the rejection, there is no overlap, at least in terms of surface area, between Applicants' claimed subject matter and the disclosure found in the references.

In view of the foregoing comments, it will be recognized that claims 2 and 3, which specify a surface area for the high porosity zeolite of no more than 400 m^2/g or less, clearly are not anticipated or rendered obvious by the patent to West. As a practical matter, it would literally impossible to hydrate the starting material of West to end up with a catalyst actually used in the transalkylation reaction of a surface area of 400 m^2/g or less.

In view of the amendment of claim 1 to incorporate the subject matter of claim 7, this claim, similarly as with claim 10, distinguishes over West not only in the recitation of a zeolite Y having a surface area less than that of the hydrated catalyst but also in the use of an aromatic alkylation catalyst having a pore size smaller than the average pore size of the low surface area zeolite Y. To the extent that the previous rejection, based upon an alleged "admitted prior art" either alone or in combination with EPA 467007 remains an issue, Applicants would respectfully refer to the comments made at pages 12-14 of Applicants' response filed May 31, 2000. Any suggestion or motivation to modify the West reference as previously proposed by the Examiner is found not in

West considered either alone or in combination with the secondary reference but only by hindsight reconstruction of the art based upon Applicants' disclosure. Further, the proposed modification of the West reference is directly contrary to the teachings specifically set forth in West. While West discloses catalysts other than zeolite Y, including ZSM-5 zeolite and silicalite, the reference does not disclose or suggest using one molecular sieve in the alkylation reaction zone and another molecular sieve in the transalkylation zone. In fact, West specifically teaches that whatever the zeolite starting material, it must necessarily be heavily hydrated for use both in the alkylation reactor and the transalkylation reactor. The use of the various starting materials disclosed in West, which are subject to hydration before use in alkylation and/or transalkylation, clearly would not lead one of ordinary skill in the art to employ an unhydrated catalyst such as silicalite in the alkylation reaction zone along with a hydrated zeolite Y in the transalkylation reactor. The entire gist of the West disclosure is that the catalyst actually used, whatever the starting materials, are to be heavily hydrated prior to use.

With respect to the obviousness-type double-patenting made in view of the claims found in U.S. Patent No. 5,955,642, this rejection is respectfully traversed for the reasons set forth in Applicants' previous response of May 31, 2000. However, as stated there, should this application be found to be in condition for allowance, except for the double-patenting rejection, Applicants would then submit a terminal disclaimer against the term of Patent No. 5,955,642.

It is noted that Applicants' claim 21 and claims 15-17 dependent therefrom are not subject to rejection based upon prior art. For the reasons advanced above, it is respectfully submitted that upon entry of this Amendment, the remaining claims should be found to be patentable over the prior art. It is respectfully requested that this Amendment be entered as placing the application in condition for allowance, subject to the submission of a terminal disclaimer. Accordingly, entry of

this Amendment is respectfully requested under the provisions of 35 U.S.C. § 116 for this reason or as placing the application in better form for appeal.

The Commissioner is hereby authorized to charge out Deposit Account No. 12-1781 for any fees that may be connected with this communication.

Respectfully submitted,

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